

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

Disposition of Claims

Claims 1 and 4-9 are pending in this application. Claim 1 is independent. The remaining claims depend directly from claim 1.

Claim Amendments

Claims 1 and 4 were amended by this reply to clarify the present invention. No new matter has been added by this reply.

Rejection(s) under 35 U.S.C. § 112

Claims 1 and 4-9 were rejected under 35 U.S.C. § 112, ¶ 2, as being indefinite. Claim 1 has been amended by this reply to replace the phrase "one of both or" with "one or both of." Accordingly, withdrawal of this rejection is respectfully requested.

Rejection(s) under 35 U.S.C. § 103

Claims 1 and 5-9 were rejected under 35 U.S.C. § 103(a) as being obvious over JP 09330947 ("JP '947") in view of JP 07082533 ("JP '533") and U.S. Patent No. 5,872,194 issued to Isshiki ("Isshiki"). To the extent this rejection still applies to the claims as amended, the rejection is respectfully traversed.

JP '947 discloses a method of producing an electrical device comprising arranging an adhesive layer containing a curable resin and electrically conductive particles on a first electrode of a first object, arranging an adhesive layer on a second electrode of a second

object, positioning the first and second electrodes in register with each other, and with the first and second object facing each other, tightly connecting the adhesive layer on the first object to the adhesive layer on the second object, thrusting the first and second objects against each other to interconnect the first and second electrodes via the electrically conductive particles, and allowing the curable resin to be polymerized by heating. However, as pointed out by the Examiner, JP '947 does not teach that the adhesive layer arranged on the first electrode contains an epoxy resin and a first curing agent nor that the adhesive layer arranged on the second curing agent contains a second curing agent. Rather, JP '947 simply indicates that a heat curable resin is appropriate.

JP '533 discloses arranging an adhesive layer containing a heat curable epoxy resin, a sulfonium salt thermal polymerization initiator, and electrically conductive particles on a first object to be bonded, arranging an adhesive layer containing a silane coupling agent having an alicyclic epoxy group on a second object, thrusting the two objects against each other with the adhesive layers therebetween, and activating the sulfonium salt (by heating) to polymerize the heat curable epoxy resin. At least some of the alicyclic epoxy groups of the silane coupling agent react with the epoxy resin while the silane group(s) also couple with the inorganic objects to be bound, thus providing increased interface adhesion.

Neither JP '947 nor JP '533 teach that the second curing agent is mainly composed of an aluminum chelate or aluminum alcoholate, and that the silane coupling agent and the aluminum chelate or aluminum alcoholate react to form a curing component for triggering polymerization. Rather JP '533 suggests the use of a sulfonium salt. The Examiner cites Isshiki as teaching aluminum alcoholate, and asserts that Isshiki teaches that either

aluminum chelates or sulfonium salts may be used as a heat activated latent hardener in curing epoxy resins.

Claim 1, as amended requires arranging an adhesive, mainly containing a thermosetting resin and a silane coupling agent as a first curing agent, at least on said first electrode, to form an adhesive layer, wherein electrically conductive particles are added to said adhesive from the outset; arranging a second curing agent, reacted with said first curing agent by heating to polymerize said thermosetting resin, at least on said second electrode, to form a layer of the second curing agent, said second curing agent being mainly composed of one or both of an aluminum chelate and an aluminum alcoholate; positioning said first and second electrodes in register with each other; tightly contacting said adhesive on said first object for bonding with said second curing agent on said second object for bonding; and thrusting and heating said first and second objects against each other for bonding to develop a curing component by reaction of said silane coupling agent as a main component of said first curing agent and one or both of said aluminum chelate and said aluminum alcoholate of the second curing agent and for interconnecting said first and second electrodes through said electrically conductive particles and allowing said thermosetting resin to be polymerized with said curing component by heating. Advantageously, in accordance with the present invention, as claimed, the first object for bonding and the second object for bonding are made up by polymerizing the thermosetting resin at a lower temperature and for a shorter period of time than the conventional adhesive.

The Applicant respectfully notes that in order to establish a *prima facie* case of obviousness, there must be a suggestion or motivation to combine the referenced teachings and a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488, 493 (Fed. Cir. 1991) "Where claimed subject matter has been rejected as obvious in view of a combination of prior art

references, a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a *reasonable expectation of success*." *Id.* (emphasis added).

The Examiner has asserted that it would have been obvious to one of ordinary skill in the art to use, as the adhesive layer arranged on the first and second electrodes of JP '947, the adhesive layers arranged on the first and second objects taught by JP '533, to achieve an adhesive having a long shelf life, a low cure temperature, and a strong bond between the first and second electrodes. However, Application respectfully notes that there is no teaching or suggestion of the above-mentioned characteristics of the present invention.

Specifically, while the Examiner attempts to cite JP '533 as teaching the claimed adhesive layer (except the aluminum chelate or alcoholate, which the Examiner cites as being taught in Isshiki), Applicant respectfully asserts that nowhere in JP '533 is there a teaching or suggestion that its silane coupling agent is used as a curing agent for generating an active species (cations) including curing initiation properties by interaction with a second curing agent (aluminum chelate or alcoholate, as claimed). Rather, use of the silane coupling agent in JP '533 is simply to produce an improvement in interfacial adhesion by contacting the silane coupling agent with the adhesive surface. *See* JP '533, paragraph [0009]. However, as required by claim 1, when the first and second objects are thrust together, the silane coupling agent reacts with one or both of the aluminum chelate and aluminum alcoholate to form a curing component, whereby it is the developed curing component that initiates polymerization of the thermosetting resin. Thus, JP '533 is distinct from the present application in composition, polymerization

mechanism, and purpose, and one of ordinary skill in the art would have had no reasonable expectation of success in modifying the references as asserted by the Examiner to arrive at the claimed invention. Moreover, because the silane coupling agent, as taught by JP '533, does not play a role in the polymerization initiation, if the sulfonium salt of JP '533 were substituted with the aluminum chelate of Isshiki, one skilled in the art would also not have a reasonable expectation of success that the silane coupling agent and aluminum compound would react to form a curing component that triggers polymerization.

As shown above, independent claim 1 is not obvious in view of JP '947, JP '533, and Isshiki, whether considered alone or in combination. Thus, claim 1 is patentable in view of JP '947, JP '533, and Isshiki. Dependent claims are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 4 is rejected under 35 U.S.C. § 103(a) as being obvious over JP '947, JP '533, Isshiki, as applied to claim 1 above, and further in view of either one of U.S. Patent No. 4,772,672 to Isozaki ("Isozaki") or JP 07011152 ("JP '152"). This rejection is respectfully traversed.

As shown above, claim 1 is patentable over JP '947, JP '533, and Isshiki. Isozaki and JP '152, which the Examiner cites as teaching the claimed aluminum chelate, do not provide that which JP '947, JP '533, and Isshiki lack with respect to independent claim 1. Thus, independent claim 1 is patentable over JP '947, JP '533, Isshiki, Isozaki, and JP '152. Dependent claims are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 5-6 are rejected under 35 U.S.C. § 103(a) as being obvious over JP '947, JP '533, Isshiki, as applied to claim 1 above, and further in view of JP 09067427 ("JP '427"). This rejection is respectfully traversed.


As shown above, claim 1 is patentable over JP '947, JP '533, and Isshiki. JP '427, which the Examiner cites as teaching the claimed silane coupling agent, does not provide that which JP '947, JP '533, and Isshiki lack with respect to independent claim 1. Thus, independent claim 1 is patentable over JP '947, JP '533, Isshiki, and JP '427. Dependent claims are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 17155/003001).

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Respectfully submitted,

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Attachments